

REMARKS

Applicants respectfully request reconsideration of this application in view of the foregoing amendments and the following comments.

In the Office Action mailed February 10, 2004, claims 1-25 and 29 were rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over U.S. Patent No. 6,162,132 to Yoneyama (the "Yoneyama patent"), in view of a combination of U.S. Patent No. 6,254,494 to Hasebe et al. (the "Hasebe patent"), U.S. Patent No. 6,319,148 to Tom (the "Tom patent"), and U.S. Patent No. 4,471,961 to Masghati et al. (the "Masghati patent"). Also in the Office Action, claims 26-28 were rejected under 35 U.S.C. § 102(e), as allegedly anticipated by the Yoneyama patent. The Examiner failed to examine claim 30, which had been added to the application by the Amendment dated December 2, 2003.

By this Amendment, Applicants have made minor amendments to independent claim 1, to clarify certain previously recited features. Applicants also have amended independent claim 26 to add a feature that clarifies the distinctions over the cited Yoneyama patent and to clarify the other, previously recited features. Amended independent claim 1 and its dependent claims 2-25, as well as amended independent claim 26 and its dependent claims 27-30, should now be allowed.

The specific rejections of claims under 35 U.S.C. §§ 103(a) and 102(e) are discussed below.

Rejection of Claims under 35 U.S.C. § 103(a)

As mentioned above, claims 1-25 and 29 were rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over the Yoneyama patent in view of a combination of the Hasebe, Tom, and Masghati patents. Applicants respectfully traverse this rejection.

Applicants do not disagree with the Examiner's overall characterizations of the *individual* disclosures of the primary reference (i.e., the Yoneyama patent) and the secondary references (i.e., the Hasebe, Tom, and Masghati patents). However, Applicants do disagree with the conclusions drawn by the Examiner from these references.

Regarding the primary Yoneyama patent, the Examiner stated as follows:

Here, the primary reference to Yoneyama recognizes that a lower center of gravity will make it easier to hit the ball higher. In Yoneyama, the weights have been placed adjacent the plane and generally arranged in a front-to-rear direction, much like the applicant has proposed. True, Yoneyama does not recognize that maximizing this arrangement may have an effect on the horizontal moment of inertia.

Office Action dated February 10, 2004, page 4.

Applicants do not disagree with the Examiner's brief characterization of the cited Yoneyama patent. The patent does, in fact, disclose a club head having balance weights located along a front/back axis, below the club head's horizontal centerline. In characterizing the Yoneyama patent, the Examiner stated that it "does not recognize that maximizing this arrangement may have an effect on the horizontal moment of inertia." But "maximizing this arrangement" is *not* a proper characterization of Applicants' invention. Applicants' invention relates *not* to a mere maximization of moment of inertia about a particular horizontal axis. Rather, it relates to maximizing a *ratio* of such moment of inertia to the club head's volume.

More particularly, Applicants' invention involves a recognition that the club head's moment of inertia (in units of $\text{kg}\cdot\text{mm}^2$) about a horizontal axis extending through the club head's center of gravity and parallel to the strike face should be greater than or equal to approximately 77 plus 0.46 times the head volume (in units of cc). This is very different from merely maximizing a moment of inertia, which ordinarily would occur automatically merely by increasing head volume. That is not the case for the parameter recited in Applicants' claimed invention, because head volume is factored into the recited formula. For an exemplary club head having a head volume of 300 cc, the specified moment of inertia would need to be approximately 215 $\text{kg}\cdot\text{mm}^2$ or greater. For a 400 cc club head, the moment of inertia would need to be 261 $\text{kg}\cdot\text{mm}^2$ or greater. The significance of the relationship between a club head's moment of inertia and its head volume was not recognized by the Yoneyama patent or by any other of the cited references.

Regarding the Hasebe, Tom, and Masghati patents, the Examiner stated generally that these secondary references disclose "a distinct relationship between placement of the center of gravity and the moment of inertia." Regarding the Masghati patent in particular, the Examiner stated that it "teaches that optimizing the weight distribution of the head will help reduce rotation of the head about the vertical and horizontal axes" and that a "very basic principle taught by Masghati is that concentrating weight towards the top or sole of the head may increase the moment of inertia about the horizontal axis."

Again, Applicants do not disagree with these generalized characterizations of the cited Hasebe, Tom, and Masghati patents. However, Applicants do disagree with the Examiner's asserted conclusion that these generalized disclosures would have rendered obvious Applicants' claimed invention. These secondary references, taken either alone or in combination, would not have suggested to those skilled in the art how to modify the Yoneyama club head to arrive at Applicants' claimed invention.

First, the Hasebe patent discloses several embodiments (see FIGS. 1, 2, and 5-10) of club heads having one or more gravity-adjusting pieces (i.e., weights) placed along the heel-toe axis, adjacent to the front face, to move the club head's cg forward toward the front face and lower toward the sole. In an alternative embodiment (see FIGS. 3 and 4), a first gravity-adjusting piece (A) is placed near the toe and front face, a second piece (B) is placed near the back side, and a third piece (C) is placed near the heel and front face. These weights are sized such that $A+B \leq C$. All of these embodiments are said to increase the club head's moment of inertia about a vertical axis through the club head's cg. (Hasebe, col. 2, lines 54-58.)

Nowhere in the Hasebe patent is it suggested that the ratio of the club head's moment of inertia about the specified horizontal axis to the club head's volume comply with the formula specified in Applicants' claim 1. Indeed, the Hasebe patent fails even to suggest that this ratio is a parameter of significance. For this reason, the Hasebe patent fails to remedy the deficiencies of the Yoneyama patent in disclosing Applicants' claimed invention.

The Tom patent teaches placement of the club head's center of gravity as far as possible from the point of application of the swing force, i.e., the shaft. This maximizes the moment of inertia about the shaft axis and, therefore, minimizes the tendency of the head to

rotate at impact. (Tom patent, col. 3, lines 49-54.) Applicants note, however, that this teaching is incompatible with the disclosure of the Yoneyama patent, which calls for the placement of two balance weights generally near the middle of the club head's front/back axis, not particularly distant from the club head's shaft axis.

Nowhere in the Tom patent is it suggested that the ratio of the club head's moment of inertia about a particular horizontal axis to the club head's volume comply with the formula specified in Applicants' claim 1. Indeed, the Tom patent fails even to suggest that this ratio is a parameter of significance. For this reason, the Tom patent fails to remedy the deficiencies of the Yoneyama patent in disclosing Applicants' claimed invention.

Lastly, the secondary Masghati patent teaches the use of weights "to increase the moment of inertia along the true axis of rotation as illustrated in FIGS. 16 and 17 rather than along a vertical assumed axis of rotation." (Masghati patent, col. 6, lines 45-48.) Increasing the moment of inertia along the "true axis of rotation" would be achieved by placing weights as far as possible from that axis. However, placing weights as far as possible from the "true axis of rotation" will not increase the moment of inertia about the generally horizontal axis defined in Applicants' claimed invention. The disclosures of the Masghati and Yoneyama patents are inherently incompatible with each other. The Masghati patent actually teaches away from Yoneyama's disclosure of placing weights along the club head's front/back axis.

Nowhere in the Masghati patent is it suggested that the ratio of the club head's moment of inertia about the specified horizontal axis to the club head's volume comply with the formula specified in Applicants' claim 1. Indeed, the Masghati patent fails even to suggest that this ratio is a parameter of significance. For this reason, the Masghati patent fails to remedy the deficiencies of the Yoneyama patent in disclosing Applicants' claimed invention.

Thus, none of the secondary references cited by the Examiner remedy the deficiencies of the Yoneyama patent. To the extent these secondary references provide any teachings at all related to modifying the Yoneyama club head, such teachings would not include increasing the club head's moment of inertia about the specified horizontal axis to a value greater than 77 plus 0.46 times the head volume. Indeed, none of these secondary references even recognize the significance of this club head parameter. For these reasons, the Hasebe, Tom, and

Masghati patents, taken either alone or in combination, fail to remedy the deficiencies of the Yoneyama patent in disclosing Applicants' claimed invention.

In support of the § 103(a) rejection, the Examiner asserted as follows:

Armed with the fact that the prior art teaches that a hollow club head may include increased weight adjacent the sole, with the weight oriented in a front-to-rear direction such that the center of gravity is lowered and that this lowering of the center of gravity results in an increase in ball carry while the added concentration of weight at the sole increases the moment of inertia in the horizontal direction, the skilled artisan would have clearly found it obvious to modify the Yoneyama device to maximize the moment of inertia about the horizontal axis. Again, the applicant has not provided any evidence that the claimed parameters, i.e., a first moment of inertia about the horizontal axis greater than or equal to approximately 77 plus 0.46 times the head volume in cubic centimeters, as required by claims (sic) 1, are for any unobvious purpose.

First, Applicants disagree with the first portion of the quoted passage, in which the Examiner asserted that "the added concentration of weight at the sole increases the moment of inertia in the horizontal direction." This is incorrect. The moment of inertia about this axis is determined by every portion of the club head's mass as a function of its distance from the axis. Relocating any amount of mass to the club head's sole will not necessarily increase such moment of inertia. In fact, it actually will *decrease* the moment of inertia if such mass is being relocated from a position further from the axis.

Further, Applicants disagree with notion implicit in the second portion of the quoted passage, i.e., that the specified moment of inertia/head volume threshold represents merely the optimization of a result-effective variable. This notion previously was asserted expressly in the Office Action dated July 2, 2003, in which the Examiner asserted as follows:

"In other words, the variables are recognized as being result-effective.

Where a parameter(s) optimized is recognized as being result-effective,

that optimization is normally considered an obvious matter to one having ordinary skill in the art. See In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977) . . .”

Office Action dated July 2, 2003, page 4.

One key requirement for concluding the obviousness of optimizing a result-effective variable is that the art must have recognized that the parameter being optimized was, in fact, a result-effective variable. In the very case cited in the Examiner's own quotation, an obviousness rejection of claims was reversed because the claims recited a threshold for a parameter “not recognized to be a result-effective variable.” In re Antonie, 195 USPQ at 9. Basically, if it is not recognized in the art that a particular parameter has an effect on performance, then it cannot be held to be obvious to optimize such parameter.

In our present case, the parameter in question has *not* been recognized in the art as a “result-effective variable.” Applicants suspect that the Examiner might previously have had the mistaken understanding that the variable is merely the moment of inertia about a particular horizontal axis. As discussed above, it is not. The parameter constitutes, in effect, a ratio of such moment of inertia to the club head's volume. Specifically, the parameter calls for the moment of inertia ($\text{kg}\cdot\text{mm}^2$) to be greater than or equal to approximately 77 plus 0.46 times the head volume (cc). None of the cited references referred in any way to the significance of this parameter. Accordingly, the Examiner's reliance on the obviousness of optimizing a result-effective variable is, in our case, misplaced.

For these reasons, it would not have been obvious to one skilled in the art to have modified the club head of the Yoneyama patent in view of the teachings of the Hasebe, Tom, and Masghati patents in a way that satisfies the requirements of independent claim 1. The § 103(a) rejection of independent claim 1 and its dependent claims 2-25, therefore, is improper and should be withdrawn.

Rejection of Claims 26-28 Under 35 U.S.C. § 102(e)

Also as mentioned above, claims 26-28 were rejected under 35 U.S.C. § 102(e), as allegedly anticipated by the Yoneyama patent. Applicants respectfully traverse this rejection.

Independent claim 26 defines a club head comprising a strike face, an outer shell, and a plurality of weights positioned substantially along a front/back axis extending generally perpendicular from the strike face, entirely below the club head's horizontal centerline. These weights are defined to comprise 10 to 40 percent of the club head's total mass. In addition, by this Amendment, Applicants have further amended independent claim 26 to call for the club head's volume to be greater than or equal to 250 cc.

The Yoneyama patent discloses a similar club head, having a strike face, an outer shell, and two balance weight members positioned along a front/back axis extending generally perpendicular from the strike face, entirely below the club head's horizontal centerline. A range of head volumes is disclosed, with each calling for the balance weights to comprise different percentages of the club head's total mass. Specifically, the patent states as follows:

...the weight of the balance weights is preferably less than 8% of the total weight of the head when the volume of the head is more than 250 cc. When the volume of the head is more than or equal to 150 cc and less than 250 cc, the weight of the balance weight members may preferably be from 8 to 10% of the total weight of the head. The weight of the balance weight members may be more than 10% of the total weight of the head when the volume of the head is less than 150 cc.

Yoneyama, col. 2, lines 7-15.

It, therefore, will be appreciated that the Yoneyama patent fails to disclose a club head as defined in independent claim 26, having a volume greater than or equal to 250 cc and a plurality of weights positioned substantially along a front/back axis extending generally perpendicular from the strike face, with the weights comprising 10 to 40 percent of the club head's total mass. For club head's having this volume, i.e., greater than or equal to 250 cc, the Yoneyama patent expressly states that the weights should comprise less than 8% of the club head's total mass. This is outside of the range of 10 to 40 percent recited in claim 26.

For these reasons, the rejection of independent claim 26 and its dependent claims 27 and 28 under 35 U.S.C. § 102(e) is improper and should be withdrawn.

Claims 29 and 30 both depend from amended independent claim 26 and, likewise, are allowable.

Conclusion

This application should now be in condition for a favorable action. Allowance of the application is respectfully requested. If for any reason the Examiner finds the application other than in allowance, he is requested to call the undersigned attorney at the telephone number indicated below. If any fees are due in connection with the filing of this Amendment, please charge such fees to Deposit Account No. 19-1853.

Respectfully submitted,
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